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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,801	10/28/2003	Shaun B. Crawford	BUR920030104US1	2800
29625	7590	02/16/2005	EXAMINER	
MCGUIRE WOODS LLP 1750 TYSONS BLVD. SUITE 1800 MCLEAN, VA 22102-4215			YOUNG, CHRISTOPHER G	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/605,801	Applicant(s) CRAWFORD ET AL.	
	Examiner Christopher G. Young	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1 sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) has been considered by the examiner. The reference crossed out by the Examiner appears to be a typo of the reference number on the form since it has nothing to do with the scope of the instant application.

Claim Rejections - 35 USC § 102 / 35 USC § 103

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-27 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brooks et al. (US Patent Application Publication US 2005/0008945).

The instant application claims are drawn to a method for manufacturing a photomask, and the photomask. The mask is made by forming an opaque layer, and etching the opaque layer by using a gas mixture having a selectivity of about 1.2:1 between the opaque layer and the resist layer.

Brooks et al. show a multi-step process for etching photomasks. The claims provide much of the instant application inventive concepts. Claims 1, 6 and 7 are specifically pointed out. Here is taught a method for processing a photolithographic reticle, comprising: positioning the reticle on a support member in a processing chamber, wherein the reticle comprises a metal photomask layer formed on a silicon-based substrate, an anti-reflective coating disposed on the metal photomask layer and a patterned resist material deposited on the anti-reflective coating; etching the anti-reflective coating with an oxygen-free processing gas; and etching the metal photomask layer with an oxygen containing processing gas. Claim 6 recites the method of claim 1, wherein the oxygen containing processing gas comprises an oxygen containing gas selected from the group of oxygen (O_{2}), carbon dioxide (CO_{2}), and combinations thereof, and a halogen containing gas selected from the group of chlorine (Cl_{2}), silicon tetrachloride ($SiCl_{4}$), boron trichloride (BCl_{3}), and combinations thereof. Claim 7 recites the method of claim 6, wherein the oxygen

containing processing gas further comprises an inert gas selected from the group of helium, argon, xenon, neon, krypton, and combinations thereof.

These claims clearly show the claimed combination of gasses for the etchant in the instant application (see claim 2 of the application). The particular ratios of the etching gas are shown in paragraph [0066]. The processing gas for etching the metal photomask layer includes oxygen gas, chlorine gas, and an inert gas. The processing gas may be introduced into the processing chamber at a flow rate between about 150 sccm and about 350 sccm during the etching process. Oxygen gas is introduced into the processing chamber at a flow rate between about 25 sccm and about 100 sccm. Chlorine gas is introduced into the processing chamber at a flow rate between about 200 sccm and about 270 sccm. The inert gas, for example, helium, is introduced into the processing chamber at a flow rate between about 25 sccm and about 70 sccm. The ratio of chlorine gas to oxygen gas in the processing gas is between about 2.7:1 and about 8:1.

The preferred metal layer, and reflection prevention layer are also shown in the specification at paragraph [0034]. An anti-reflective coating (ARC or ARC layer) may be formed on or comprise part of the deposited metal layer. The ARC layer is believed to improve photolithographic precision in patterning features to be formed in the opaque layer. The ARC layer may be a metal layer incorporating nonmetallic contaminants or impurities to form, for example a metal oxynitride layer, such as chromium oxynitride. Chromium oxynitride may be formed during deposition of the metal layer or by exposing the metal layer to a suitable atmosphere. The metal oxynitride layer may comprise up

to the top 30% of the total thickness of the metal layer or up to the top 30% of the combined metal layer and ARC material.

Based on the claims, and the specification overall, the basic method and mask claimed in the instant application is described, taught and suggested by Brooks et al. However, the specific etching ratio as claimed is not particularly pointed out within the prior art reference. Since the prior art reference is utilizing the same or similar etching gases, on the same or similar substrates coated with metal, to produce the same or similar masks, it is the Examiner's position that the etchant selectivity is an inherent feature of the reference. In a case such as this where it is not clear what, if any, difference exists between the prior art and the instant application a combination rejection under 35 USC 102/103 is proper.

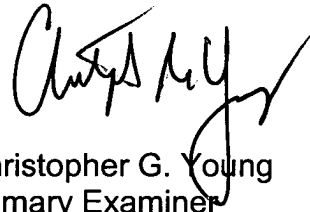
Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher G. Young whose telephone number is 571-272-1394. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1756

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Chris G. Young", is written over the printed name and title.

Christopher G. Young
Primary Examiner
Art Unit 1756

cgy